

September 2020

# GEORGIA PATHWAYS

M A G A Z I N E

## Contact Tracing

Innovative breakthrough

## Emerging Tech

Jeff Felice  
CertNexus

## FinTech Credits

Ga. DOE



Regardless of your school subject, career path or daily responsibilities, you use STEM skills. A more complete understanding of them and the recognition of their use daily will make you more productive, creative, innovative and successful.

**“Every career field uses STEM skills every day”**



*Every teacher is a STEM teacher.  
Every school is a STEM school.*

## To understand STEM...

...you must DEFINE STEM, but you cannot define an acronym using the words it stands for; *you must define the words the acronym stands for.*

Universities and organizations around the world continue to debate what a STEM career is. There is no doubt that “every career” uses STEM skills and this observation remains the focus of STEM Magazine.

SCIENCE: “The systematic accumulation of knowledge” (all subjects and careers fields)

TECHNOLOGY: “The practical application of science” (all subjects and careers)

ENGINEERING: “The engineering method: a step by step process of solving problems and making decisions” (every subject and career)

MATHEMATICS: “The science of numbers and their operations, interrelations, combinations, generalizations, and abstractions” (every career will use some form[s])

For a moment, set aside any preconceived notions of what you think a STEM career is and use the above dictionary definitions to determine the skills used in any career field you choose.

These definitions are the “real” meaning of STEM and STEM careers.

The Technology Association of Georgia Education Collaborative (TAG-Ed) strengthens the future workforce by providing students with relevant, hands-on STEM learning opportunities and connecting them to Technology Association of Georgia (TAG) resources. Formerly the TAG Foundation, TAG-Ed is a 501(C)(3) non-profit organization formed by TAG in 2000. Later, the organization's name was re-branded to TAG Education Collaborative to facilitate our role as the leaders for K-12 STEM education in Georgia.

President / CEO  
Larry K. Williams

TAG-Ed Executive Director  
Heather Maxfield

Publisher  
Wayne Carley  
[wayne@tagonline.org](mailto:wayne@tagonline.org)

The Technology Association of Georgia (TAG) and  
TAG Education Collaborative  
4400 North Point Parkway  
Suite 155  
Alpharetta, Ga. 30022

<http://www.tagedonline.org>

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## **Georgia State Astronomy**

NOELLE TOUMEY REETZ / GSU

## **FinTech Credits**

GEORGIA DEPT. OF EDUCATION

## **Contact Tracing Innovation**

KATRINA R. MACHETTA

## **Virtual STEM**

REBECCA MURRY

## **Emerging Tech**

JEFF FELICE

## **Cyborg**

WAYNE CARLEY

## **Tech in School**

KATHY SCOTT

## **Game Changer**

JULIE KANTOR

Here's another informative issue of Georgia Pathways focused on digital health that we encourage you to share statewide as it is a great resource for home use and parental inclusion.



Digital Health has risen to the top of our technology radar these days as we are experiencing our doctor visits via computer, video and tablet. It's not new technology, but it has proven to be a valuable asset for everyone's safety, convenience and timely interaction.

The TAG Digital Health Think Tank focuses on Georgia's rapidly expanding healthcare field. Our regional society members include Healthcare IT and management professionals, physicians, allied health professionals and hospital administrative personnel. It is a very active and pertinent society given our current environment and offers a series of informative events.

We will continue to focus on the rapid advances in healthcare technology that are having an enormous impact on the healthcare industry. Emerging biotech firms, new drugs and treatments are of particular interest right now with on-going regulatory pressures, funding for promising start-ups and the management of this evolving industry.

Our TAG Digital Health mission continues to be the furthering of Georgia as a leader in healthcare tech. We plan to expand our education efforts as well as networking opportunities and collaboration across the Atlanta region, with the many industry stakeholders and community leaders who play such an important role.

Along with content in Georgia Pathways, be sure and visit TAG's website ([tagonline.org](http://tagonline.org)) for current updates on digital health innovations, challenges, events and breakthroughs. Thank you for sharing this issue and please consider submitting content as often as you wish for Georgia readership.

Larry K. Williams  
President  
TAG-Ed

Larry K. Williams serves as the President and CEO of the Technology Association of Georgia (TAG) and President of the TAG Education Collaborative (TAG-Ed). TAG-Ed's mission is to strengthen Georgia's future workforce by providing students with relevant, hands-on STEM learning opportunities by connecting Technology Association of Georgia (TAG) resources with leading STEM education initiatives.

By Noelle Toumey Reetz

Georgia State University's Center for High Angular Resolution Astronomy (CHARA) in Mount Wilson, Calif., has been awarded \$2.5 million from the National Science Foundation's Major Research Instrumentation (MRI) Program to support a new mobile telescope to the CHARA Array, the largest optical interferometer in the world. The NSF has also committed to continue support for CHARA's open-access program for guest observers. A three-year, \$4.6 million grant is set to begin in September 2021 and will allow scientists from across the globe to access the telescope array for research.

"As a unique facility, the CHARA Array offers new science opportunities and demand for time on the Array is very high," said Gail Schaefer, research scientist at CHARA. "Since the inception of the community-access program in 2016, almost 300 astronomers from across the U.S. and around the world have applied for time."

The Array's six telescopes, spread out across the mountain, combine to sim-

ulate a single instrument, creating the world's most detailed, high-resolution view of the stars. Using the \$2.5 million grant, the center will add a seventh mobile telescope, increasing the array's magnifying power. Theo ten Brummelaar, director of the CHARA Array, says construction of the new telescope should be complete by 2023.



CHARA's telescopes are positioned over Mount Wilson to offer the resolving capability of one large telescope with a diameter of about one fifth of a mile.

By sending starlight to a central beam-combining laboratory, astronomers can measure the size and shapes of stars and map the orbits of stellar companions. They can also catch stars in the process of formation and resolve disks of gas and dust around young stars where planets form. CHARA has created the first images of starspots on the surfaces of nearby stars, documented the exploding fireball stage of a nova, captured a rare stellar eclipse by

companion star, and demonstrated that rapidly rotating stars are bulged and cooler at the equator and flattened and hotter at the poles.

“This new telescope will allow us to increase the Array's diameter to over one kilometer and provide the highest resolution of any instrument in the world,” ten Brummelaar said.

The CHARA Array, which is operated by the Department of Physics and Astronomy, plays a key role in teaching scientists and students at Georgia State and other universities worldwide. The open-access program partners with five other schools to give researchers access to the center, and Georgia State has awarded 18 doctorates to students who conducted graduate research there.

“We now offer 60 nights per year to guest observers. With the new grant, we expect to expand community access to up to 100 nights per year,” Schaefer said.





Richard Woods, Georgia's School Superintendent  
"Educating Georgia's Future"

Georgia Department of Education, University System of Georgia  
partner on FinTech Career Pathway

**"Students can gain college credit for high school FinTech courses."**

The Georgia Department of Education and the University System of Georgia have partnered to create a high-school Career Pathway focused on financial technology (FinTech), which aligns to USG's associates-level FinTech degree program. Georgia is an emerging leader in FinTech – the industry which uses technology to offer various financial services to consumers. Seventy percent of all financial transactions worldwide pass through Georgia, and there is an immediate need for skilled employees.

"The mission of our Career, Technical, and Agricultural Education program is to respond nimbly and quickly to workforce needs so students have the best possible opportunities for a successful future," State School Superintendent Richard Woods said. "This is a perfect example of a partnership that will expand options for students and strengthen the local workforce in our state."

The high school FinTech pathway contains three courses modeled on those in the USG degree program. The courses may be offered as a standard high school

pathway, or can be offered for dual high-school and college credit. Students may also take the remaining two required FinTech courses and academic courses through dual enrollment, making it possible for a student to graduate high school with the USG degree program completed.

An articulation agreement has been created collaboratively between USG and GaDOE that allows college credit to be granted for these three courses when the teacher possesses certain teaching credentials required by USG. Articulation will provide students with college credit without the additional costs associated with dual enrollment.

Business and industry representatives, USG partners, and high-school educators in finance and computer science content worked together to develop the USG courses into high-school courses while retaining their rigor, content, and integrity.

Georgia's Career, Technical, and Agricultural Education (CTAE) program delivers real-world, workforce-ready skills for Georgia students – options that can lead

to higher education, military service, apprenticeship or directly into a rewarding career. CTAE helps students develop employability skills and strengthens the pipeline for local and regional industries.

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## FinTech Virtual Event

Fintech South 2020

October 5 - October 9

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*Curated Networking*

*Virtual Marketplace*

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Fintech South 2020 is a world-class virtual summit with its nexus in Atlanta, a fintech hub generating \$72+ billion in revenues and attracting \$1.1+ billion in venture capital in 2019 alone.

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<https://fintechsouth.com/>



# New contact tracing tool helps scientists assess prevalence of COVID-19 infections

By Katrina R. Machetta

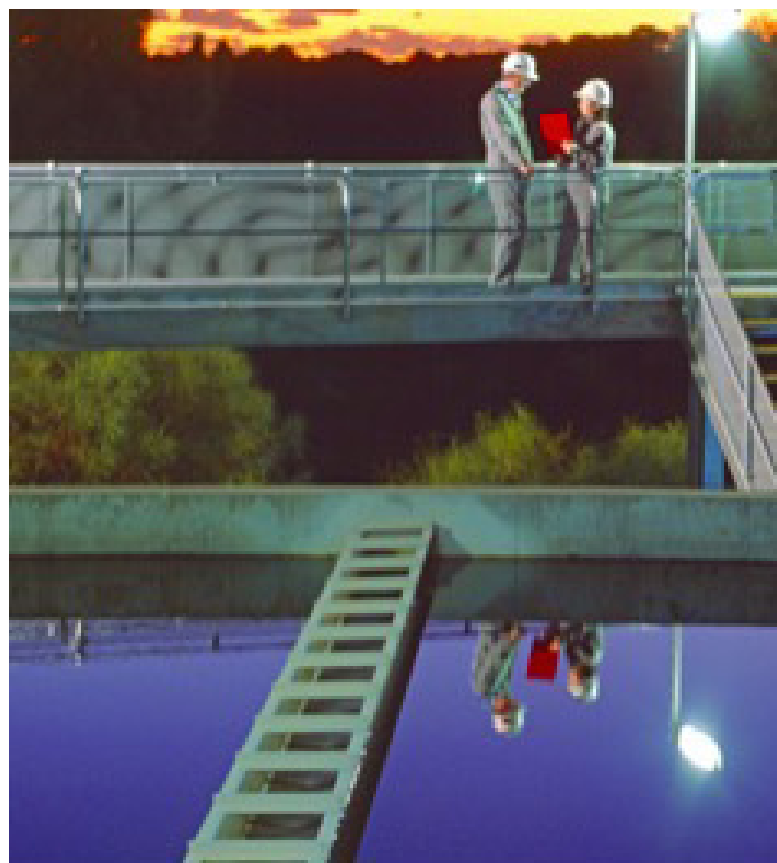
Teams across the United States have developed a tool to help scientists to quickly track and analyze the novel coronavirus with the help of sewage systems.

The Center for Disease Control (CDC) approved the newest method of Covid-19 contact tracing – known as sewage surveillance – on August 8 of this year. The number of cities using this new method is growing daily as scientists gather live data using sewage surveillance to help stop further coronavirus infections.

Sewage surveillance tests the number of virus copies that are in a specific sewage sample and, from there, scientists can calculate how many people in that community are infected by Covid-19.

Sewage surveillance involves teams of highly specialized experts and licensed facilities to obtain accurate and effective results. Sewage surveillance provides a way for scientists to collect group samples from communities across the country regardless of age, gender or resources in that community, and to calculate how many people in a specific community have Covid-19 in a timely manner.

“By using this method, we can detect if the interventions we are using to stop the virus are successful,” said Dr. Charles Gerba, a microbiologist and professor of Environmental Science at the University of Arizona. “Through the sewage system, we can monitor the virus spread in specific dormitories at the University of Arizona, and then we can test those specific students to figure out who has the virus in both asymptomatic and symptomatic individuals.”



Water headed for wastewater treatment plants can be tested in an early warning surveillance system to track COVID-19 prevalence.

Over the phone contact tracing provides information about which individuals may have caught the virus, but not about how large the total number of infections is within a community.

With sewage surveillance, on the other hand, scientists are readily tracking the overall spread and infection rates around the country.

“The problem with the over the phone contact tracing method is that the public does not know how many people in a specific area have asymptomatic and symptomatic infections,” said John Pardue, Civil and Environmental Engineering Professor at Louisiana State University. “Knowing how many individuals have the virus is the key to stopping the spread of Covid-19.”



for the presence of the novel coronavirus gene to develop an  
ence in a community. /Robert Garvey via CSIRO

Sewage surveillance has already existed for decades according to Professor Pardue. It helped scientists gather live data and find information about diseases like Polio and Ebola. But for contact tracing of Covid-19, the CDC has approved this method only very recently. “Since sewage surveillance is fairly new, I think the CDC was being very cautious with this,” said Dr. Gerba on the CDC’s decision to only recently approve this form of contact tracing. “They want to be completely sure this application is effective.”

According to the University of Mississippi Medical Center, the amount of time it takes to receive Covid-19 test results is dependent on each testing center, but results typically take several days after the test. By contrast, contact tracing through sewage surveillance takes no more than a day, but usually just a couple of hours.

“Over the phone contact tracing does not give you a lot of information in the time you need it, and sewage surveillance is less accurate when it comes to identifying specific individuals,” said Professor Pardue. “The big thing that we have seen in the sewage system is a direct impact on public health. We saw a big surge of virus samples in the sewage about a week ahead of hospital data.”

Although this method has been garnering effective results, it also comes with challenges, including costs. While most individual tests are covered by insurance, sewage surveillance is covered solely by universities or by the U.S. government

depending on the location where the surveillance is conducted. “It is a few hundred dollars per sample for study at the University of Arizona,” said Dr. Gerba. “It also requires very expensive equipment and facilities.”

The future of finding a cure to the virus and using this method to gain optimum results will depend on many factors including the level of precautions, the amount of resources, and most importantly, the cooperation of community members. Americans have had different reactions to this new method of contact tracing, including Stephanie Norris, a nurse at a retirement home in Ottawa, Illinois.

“I think sewage surveillance will be more effective in tracing community spread of the virus because scientists will be analyzing group samples,” she said. “In terms of specific individual infections, I think over the phone contact tracing will be better.” Other organizations throughout the United

States have also begun to test the newest method of contact tracing to assess its efficiency in monitoring the coronavirus.

Scientific teams across the country are teaming up to develop, design and implement new technologies like sewage surveillance to help eradicate the corona virus.



**Katrina Machetta** is a reporter for the Youth Journalism International and Editor of the Legacy Press Newspaper.

An avid community advocate, she serves as President of Miss STEM International; she is a member of the prestigious J Camp and the University of Texas’ Women in Engineering Create@UT.

She authors and co-authors articles on health science and technology-related subjects.



The City of Santa Barbara’s El Estero Water Resource Center.

# A SHIFT TO TEACHING STEM VIRTUALLY IN A PANDEMIC

By Rebecca Murry

STEM Integrator, K-8 United Nations International School, Queens, New York

As a former architect, I felt quite comfortable teaching a STEM unit on Architecture and Engineering. Even as an experienced 20-year educator, I was confident that I could easily make the transition to teaching remotely. Little did I know that something else was blindly lurking in the corner and that the next 3 months would prove to be one of the greatest challenges in my teaching career? So let's unpack these surprises head on. Here we go!

It was March 6, 2020, a Friday morning, when our Head of School informally told our principal that he wanted to speak to the faculty about the possibility of going virtual if one of our teachers or students ended up with Covid19. He calmly wanted to share his thoughts and brainstorm about how we could implement a plan of action in terms of mental readiness, technology, and resources.

At that point, I felt an unusual rush of adrenalin and told the principal that this was going to be fun. That word could have many hidden meanings, but at that very moment, I was curious about the transitional possibilities and how education might transpire under those virtual environments.

In the past, I have given Asynchronous and Synchronous Webinars to teachers for professional development. But teaching adults is different. As an educator, you can maintain a sense of confidence that a structure can be designed to ensure engagement and motivation for young students in a one – hour online setting.

What I was not cognitively aware of was the fact that I was about to teach indefinitely from 8:30 am to 2:45 pm every single day. Sitting still on a chair and keeping students engaged through a computer screen was definitely not an ideal brain-based teaching environment – an approach I use in my Project-Based Learning classes. Howard Gardner once said in a 2009 Edutopia interview:

*“Everything can be taught in more than one way. And anything that’s understood can be shown in more than one way. I don’t believe that because there are eight intelligences we have to teach things eight ways. I think that’s silly.*

*But we always ought to be asking ourselves, “Are we reaching every child, and, if not, are there other ways in which we can do it?”*

Gardner's theory on multiple intelligences challenges the notion that learning comes from a single dominant form of intelligence. Now widely accepted, Gardner's theory of learning holds that a blending of teaching approaches works well because we all possess multiple types of intelligences.

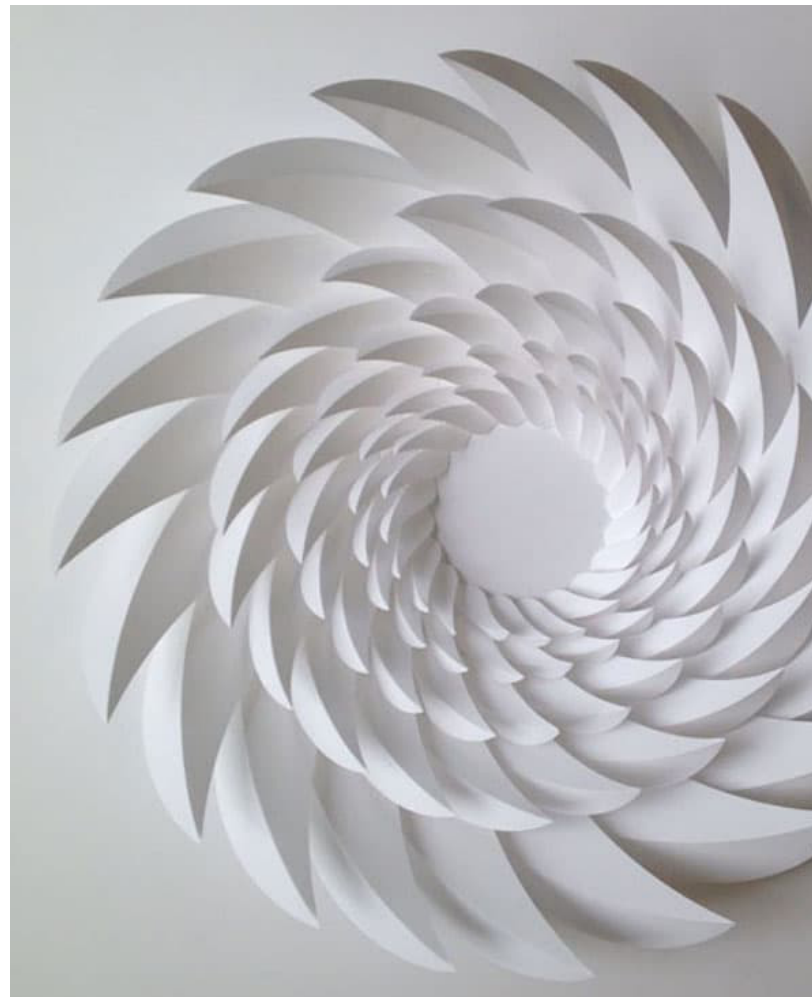
To our surprise at the Queens campus, the following week, Monday, March 9, our school had one Covid19 case in the Manhattan campus and therefore had to close both building facilities. Literally having to abandon unfinished units on Robotics with all the Mindstorm Ev3 and NXT Lego kits on the shelves left me in a state of shock and wonder. Well, as Socrates once said, "All thinking begins with wonder."

Logistically, it was impossible to distribute the Lego kits to each student given that group work was not possible because of the lockdown. We did not have enough kits to distribute individually. The daunting task of creating pop-Up virtual Robotics classes was hard to imagine. Hence for obvious reasons, the default shift to the unit of study of Architecture and Engineering! Years of paper engineering as a tool for analyzing architectural forms three dimensionally had been ingrained in me during my 20-year career as an architect. Back in the 80s and 90s, there was no such thing as a fully developed computer-aided design program.

What existed were programs that were tedious to learn and somehow conflicted

with the flow of making cardboard and paper models and drawing on tracing paper. The creative process of visual thinking required manipulation of paper and cardboard and allowed the mind to tinker with ideas gradually. It was an iterative process where design required several prototypes; thus the sleepless nights of redrawing on tracing paper and undoing cardboard models.

Learning how to fold paper and engineer various forms geometrically became the norm. As I reflected on what we had already covered and pondered how we might move forward, I realized that my students could experience paper folding as a way to understand form and model-making. It was inexpensive and very available. After all, we were on lockdown!



The first month of March was a mix of challenges and successes. We struggled with Zoom interface and had bandwidth problems. What's App became the immediate faculty communication method and Schoology, the centralized way to build STEM courses online and communicate to parents, teachers, and students.

Work was easily archived on Schoology as well as graded online – including attendance. We all overcame a huge hurdle once Schoology and Zoom were integrated, and I could now set up recurring STEM courses weekly.

Soon my STEM schedule improved and I could monitor student work both during synchronous sessions and when we were off-line. The Architecture and Engineering unit focused on Floating Water Architecture for the Future as an impact of Climate Change. Every grade level had deep dives into various complexities of architecture and engineering that helped them recognize that a future impacted by climate change would consequently modify our understanding of the built environment.

We studied animal sanctuaries in floating museums, floating entertainment centers, floating cities, water and air transport systems, even exploring floating hospitals could support practical solutions in a pandemic.



As the weeks online continued on to April, I could tell that the initial 30-minute once-a-week schedule was not enough. It slowed down the sequencing of my lessons and often I would go beyond by 5 or 10 minutes which then affected other teachers. This was not good.

By mid-April, our principal revised the schedule and made STEM a 40-minute class for K-4 and 40-minute class for Middle School twice a week. What I did not realize was that my students found the pace too slow and began to think that paper engineering was really Origami. They valued the creative process of form analysis but could somehow not transition to the function of a building evolved out of this visual process of model-making.

### **What tools and strategies does E-Learning have to activate and ensure long-term memory in a virtual environment?**

In her book *Research-Based Strategies to Ignite Student Learning*, Dr. Judy Willis, a neurologist and an elementary and middle school educator wrote about how, in order for a student to make memories or learn deeply, something or someone must capture a student's attention. Willis states further that the more memories in the storage bank, the more neuron circuits there are to connect with new information being taught. These additional neuron circuits encourage the growth of dendrites which trigger connecting cells that form new circuits for learning.

In STEM, teaching design is an iterative cycle. Every experience goes through a revision meant to improve the previous prototype. Students new to this iterative process may not necessarily appreciate the repetitive nature of paper folding in order to evaluate how form follows function in a model.

At this point, I saw the need to move on to learning how to transfer this visual model into computer-aided design. Tinkercad was available free on the browser and provided an easy solution to learning how to analyze form digitally.

Suddenly, I noticed my students recognizing the whole point of visual thinking. The availability of various tools allowed students to make connections and so led to the formation of the additional dendrites that linked one piece of learning to another. However, despite these new exposures to various stimuli, I had some passive learners who struggled to keep pace.

The absence of a Studio/Lab-like physical environment could not be replaced. Being able to walk around and visit work of their peers was only possible by screen-sharing. This required Zoom and the internet browser to work simultaneously. Audio and camera demand was high while I had to be both the radio announcer and the operator who would control annotations, chats, and white board capabilities.

Covid19 changed all preconceived notions of online learning as well as how parents understood what a good education encompassed. Both parents and schools aimed to maintain a standard comparable to that of a physical idea of a school, while the pandemic essentially leveled the playing field of every school throughout the world by requiring that we embrace radical change as educators, practically overnight. To keep my STEM class relevant and authentic, I found myself doing more research not only on brain-based learning, but also the new tools on how to make my teaching varied, non-repetitive, stimulating, and engaging.

No matter how available the tools and strategies in E-learning, I still wonder how we can successfully orchestrate it all into a lesson structure, scope and sequence, unit delivery, and assessment. What we once thought of teaching pedagogy remains the same. Now the key challenge is ensuring that pedagogy does not get lost in translation.

A consideration of the future is definitely in order. Thus far, I have a laundry list of questions still unanswered. In conclusion, let me share them with you:

- How can brain-based learning tools and strategies support remote learning from the lens of a whole school year should another pandemic occur?
- If going hybrid in-school and online becomes an option in the future, how

does teaching maintain its integrity and authenticity without the risk of redundancy?

- How can assessments in an E-learning format be redefined beyond the current narrative of formative and traditional summative versions?
- Lastly, what role will social media play in the near future in supporting the integrity of teaching and learning virtually? Will we collaborate through Snapchat, What's App, Viber, etc?

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**Rebecca Murry** was an architect for 20 years before shifting to a career in education. She was formerly the Math Coach at the United Nations International School; she planned and implemented inquiry-based instruction and innovative STEAM Project-Based Learning in mathematics. Her previous presentations in Brazil, Spain, Denmark, and Qatar for the Educational Collaborative for International Schools focus on Blended Learning, STEAM-PBL math applications, and Mind Brain Education strategies for Harvard University's Research Schools International. She is a book reviewer for NCTM's Teaching Children Mathematics magazine and has a Bachelor of Architecture from Pratt Institute and a Master of Science in Education Childhood Special and General Education from Bank Street Graduate School of Education.

She is also the Math Chair for the Educational Collaborative for International Schools. She moved on to developing the STEM program at the Queens campus of the United Nations International School where she is the STEM Integrator for K-8 students. She is focused on debate/inquiry phenomena approaches to teaching STEM and strongly believes that learning happens during moments of disequilibrium and wonder.



## The Growing Impact of Emerging Tech

By Jeff Felice  
President, CertNexus

Whether you are in a technology related field or not you most likely you most likely have come across emerging technology. If not, no worries as we are pleased to be introducing a new term and potentially exposing you to a series of exciting developments within STEM.

Often referred to as emerging tech, emerging technology is not a single technology but a term that encompasses many technologies. It is defined on Wikipedia as 'technologies whose development, practical applications, or both are still largely unrealized, such that they are figuratively emerging into prominence from a background of nonexistence or obscurity'.

Although the Wikipedia definition still holds true today, we see many technologies that have been classified as emerging tech retaining that label even as they become more commonplace in our everyday lives. Examples would be Artificial Intelligence (AI), Data Science, Internet of Things (IoT), and Robotics to name a few. Granted we still have yet to achieve the full potential of any of these technologies – and I hope we learn to harness them prior to creating a V.I.K.I. (iRobot) or HAL 9000 (2001: A Space Odyssey) – they are widely used today across governments, industry, and in our personal lives. In fact, the IDC ICT Spending Forecast Report estimates that we spent nearly \$1

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trillion on emerging technologies in 2019 which was 20% of the total \$5 trillion spent on all technology.

With anything that is new and not totally known to us there is both great anticipation and fear about what these technologies may bring. Some fear that machines will take over the world while others wonder if it will replace them at work. Others see a world where technology enables us to ride in autonomous vehicles, attend a virtual reality concert, or better predict the future.

The reality is that both hold some truths. Yet as with any technology if it is used wisely and with good intent emerging technologies can help to create a better world. Let's look at some of the ways we see emerging tech benefiting society and potential career opportunities it holds for us.

First, let's tackle the jobs question. As with any major evolutionary step with technology we will experience a shift in jobs. This is not a new phenomenon as we have seen the tractor reduce the number of farmhands, computers displace typing pools, and streaming services obsolete the video store clerk. Yet we employ more people in the world today than ever before. This happens due to more jobs being created by these technologies than the number they dislocate.

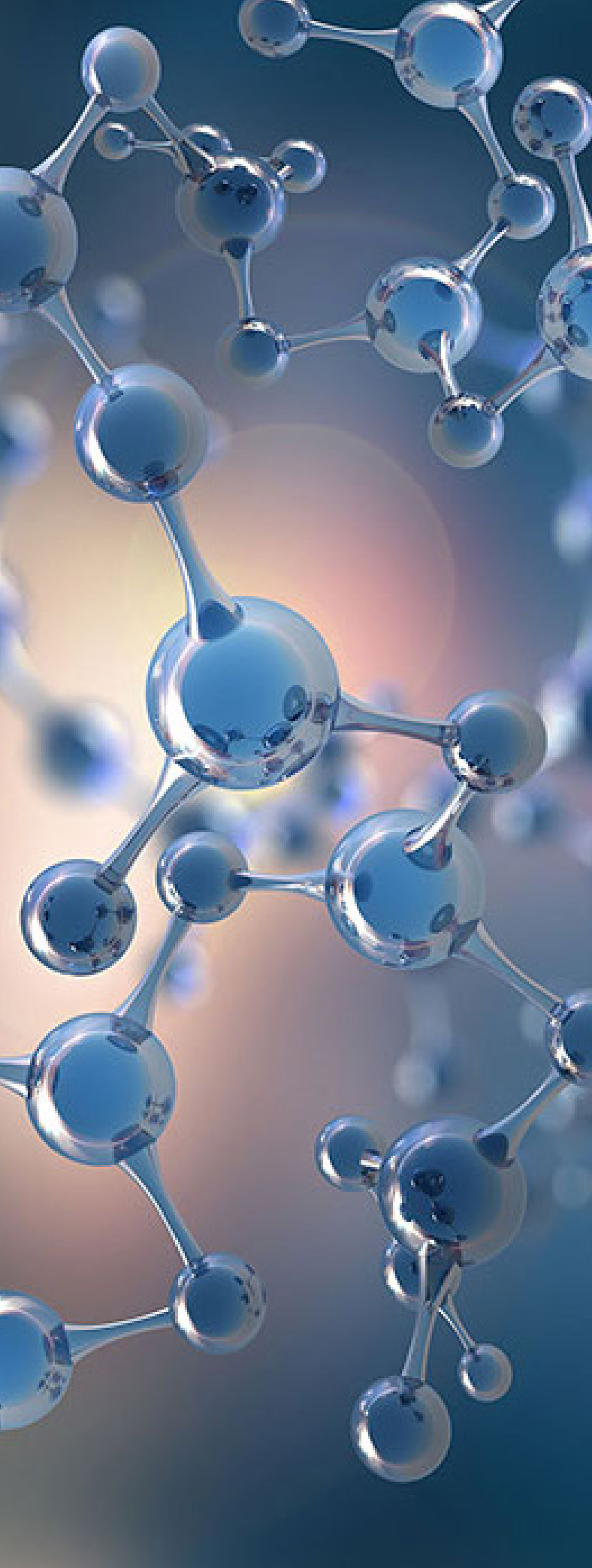
The farmhand is now a Smart Meter Installer for agriculture, the typist is a Data Analyst, and the video store clerk now

holds a role in Marketing at Netflix. And this will continue until the point that machines truly do run the world!

The World Economic Forum's 'The Future of Jobs Report' affirms the above as it predicts that in the next couple of years as many as 75 million jobs may be lost globally as more companies automate through the use of technology. At the same time, it reports that 133 million new jobs may be created through technology development combined with other trends such as an expanding global middle class. That is a net creation of 58 million jobs! And in the midst of these shifts most other jobs will be affected in that the way people work will change.

For those who love to learn and explore the future of work holds such great possibility. Jobs that we are just starting to see emerge in nanotechnology, quantum computing, and other cognitive technologies will be expanding and careers that don't exist today will be the next generation of jobs in the decades to come. It really is an exciting time for those interested in STEM careers and other career pursuits which will be impacted by technology.





What is important for us to all understand is that anyone can work with these exciting technologies. It does help if you have studied STEM topics, but we are seeing those with arts and other non-tech backgrounds find their own paths into emerging tech and flourishing in these creative professions. At the same time, we do not want to narrow the funnel into STEM careers. We lose too many potential creators, inventors, and entrepreneurs at a young age as they are unaware of the many jobs beyond programming and networking in technology fields.

While we will need more Machine Learning Developers, Data Scientists, and Robotics Engineers we also will require more marketers, consultants, and animators who will help to create, use, and expand these emerging technologies. So, if you really enjoy playing the guitar or learning about art history then throw yourself into those pursuits. You will be building skills that you can always transfer into careers within or related to STEM. And remember its never too late to learn something new!

As we shared emerging technologies, when used appropriately, will not only generate new ways of doing business and jobs but can also help to create a more interesting and equal society. Just think of the ways that in the past decade we have learned to connect with each other and our devices. In the early 2000s text messaging, social posts, and video streaming were not part of means to communicate.

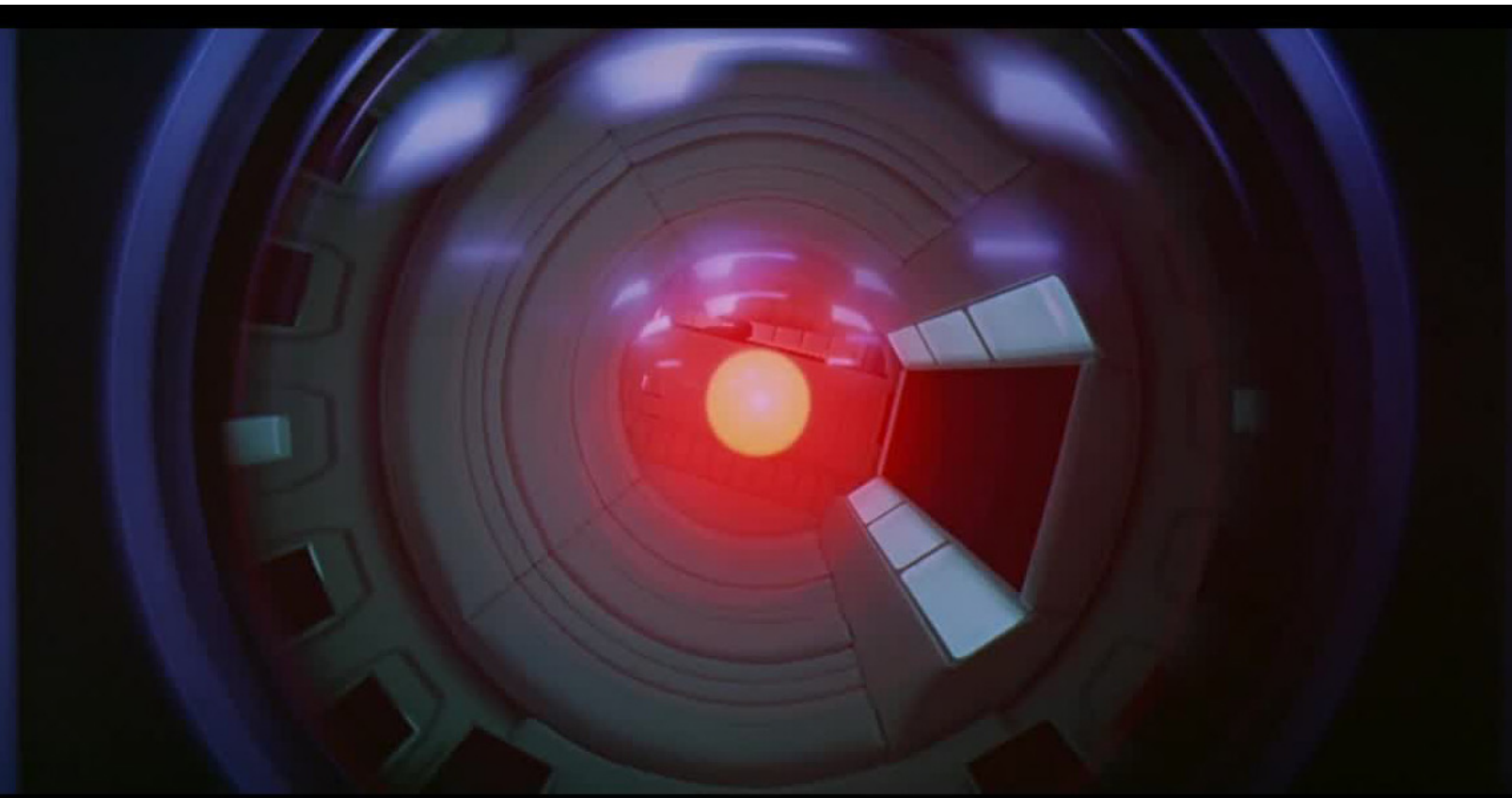
Smartphones, consumer wearables, and connected devices were not commonplace to lookup information, track our physical progress, or schedule how we heat and cool our homes. And how many of us really thought that we would have an assistant in our home like Alexa, Google Assistant, or Siri?

Although these technologies may still seem like a luxury to some, they are becoming commonplace and if you are part of Gen Z it is all you know. For those of us in older generations we are seeing the futuristic technology of Star Trek and The Jetsons come to life. Regardless of your age or perspective the fact is that these technologies are shaping the way we engage in business and our personal lives. And there is still so much to come. Think back 50 years when UCLA graduate students first connected host-to-host computers as part of ARPANET.

Now think forward to what computational capabilities can bring. Pew Research Center and Elon University's Imagining the Internet Center asked hundreds of technology experts how our digital lives would be affected in 2069. 72% of respondents thought the outcomes would be a change for the better.

As you can see, emerging tech holds so much promise for individuals and society. We need to prepare ourselves for this shift as many future jobs will require us to not only embrace these technologies but be able to work with them.

To do so we will need to invest continuously in our skills and knowledge to keep abreast of these rapidly technologies. And who knows, maybe we can create a beautiful union between V.I.K.I. and HAL that solves all the world's problems. Even if not, the pursuit can be a whole lot of fun!



# MECHATRON

## cy·borg

noun

plural noun: cyborgs

- a fictional or hypothetical person whose physical abilities are extended beyond normal human limitations by mechanical elements built into the body.

**N**ot so fictional by this definition with the introduction of mechatronic prosthetics, muscle stimulation implants, human exo-skeletons and both hearing and visual implants or replacements.

There is certainly a group of career fields that should interest our youth of today and science fiction becomes science fact. As the world becomes more dependent on computers and networks are increasingly ubiquitous, computing, information, and computation play a central role in how humans work, both intellectually and physically.

The boundaries between humans and technology are shrinking to the point where socio-technical systems are becoming natural extensions to our human experience. Whether it's our automatic home vacuum robot, our automatic parallel parking car or our smart house, or an app on our iPhone

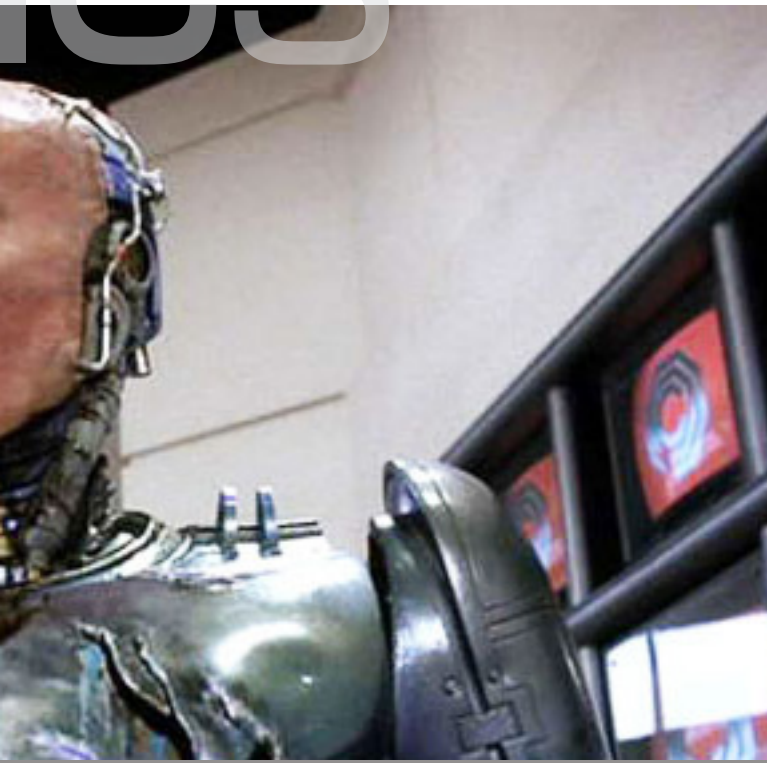


for our convenience.

Innovation is fun, exciting and certainly sparks our imaginations, but innovation is also a certainty. This means there will be careers specific to these applications and now is the time to consider where your passions are leading you.

Not everyone who will shape our technology will have a college degree. There are many examples of men and women who have taken their passion to extraordinary levels through pure drive, determination and imagination.

Short of being a “Wiz Kid” born with special powers, education is still a necessary part of making your cyborg dreams come true.



Mechatronics is the perfect blend of engineering, electronics and software development needed to make practical and effective prosthetics for children and adults alike.

From feet to legs to hands and arms, which we are already making huge strides in progress to replace, to ears, eyes, body organs and artificial muscles for those with crippling diseases that take away what we were born with; such are the opportunities for those with imagination, cool new ideas, and most importantly the drive to step forward and be part of the science.

Those born with incomplete bodies and those who have suffered a tragic loss of limb are and will continue to need the imagination and innovation of you, the student, and you the educator to lead them.

Even as a 5th grader, your interest now and Google exploration into this group of science fields may well stay with you as you head toward high school and beyond...but now is the beginning.



Progress can take many forms, and involve different kinds of computing platforms. These platforms may include “traditional” devices and systems, such as common computers and hand-held and mobile devices.

Every year, this frontier is moving towards cyber-human technologies in the “post-mobile and web” world, including robots, wearables, person-embedded sensors and computers, digital fabrication and programmable matter, virtual and augmented reality, computationally-enabled objects and environments, distributed and

networked socio-technical systems, and cloud computing.

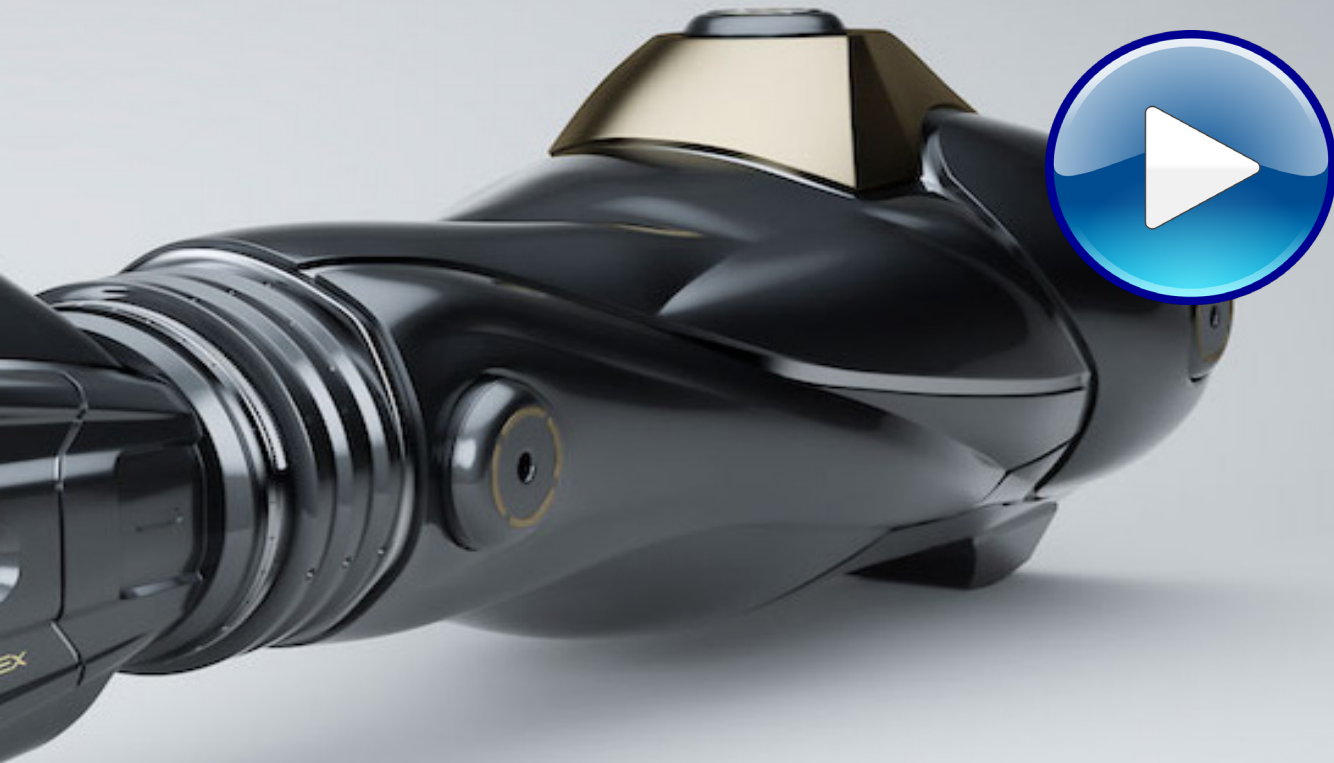
Proposed projects may work at scales ranging from an individual device with a single user; to networked and cloud-based information systems supporting collaborating groups; to large, evolving, heterogeneous socio-technical systems supported by pervasive networking; and to systems that merge the physical and virtual for both places and people.



## Angel Giuffria

- actress from “The Hunger Games”  
and amputee.

*She likes to call herself a “cyborg” and  
loves her new arm that incorporates all of  
the Mechatronics you should explore.*



# MILLION's have been invested:

*Do students and teachers know how to use the technology we've provided?*

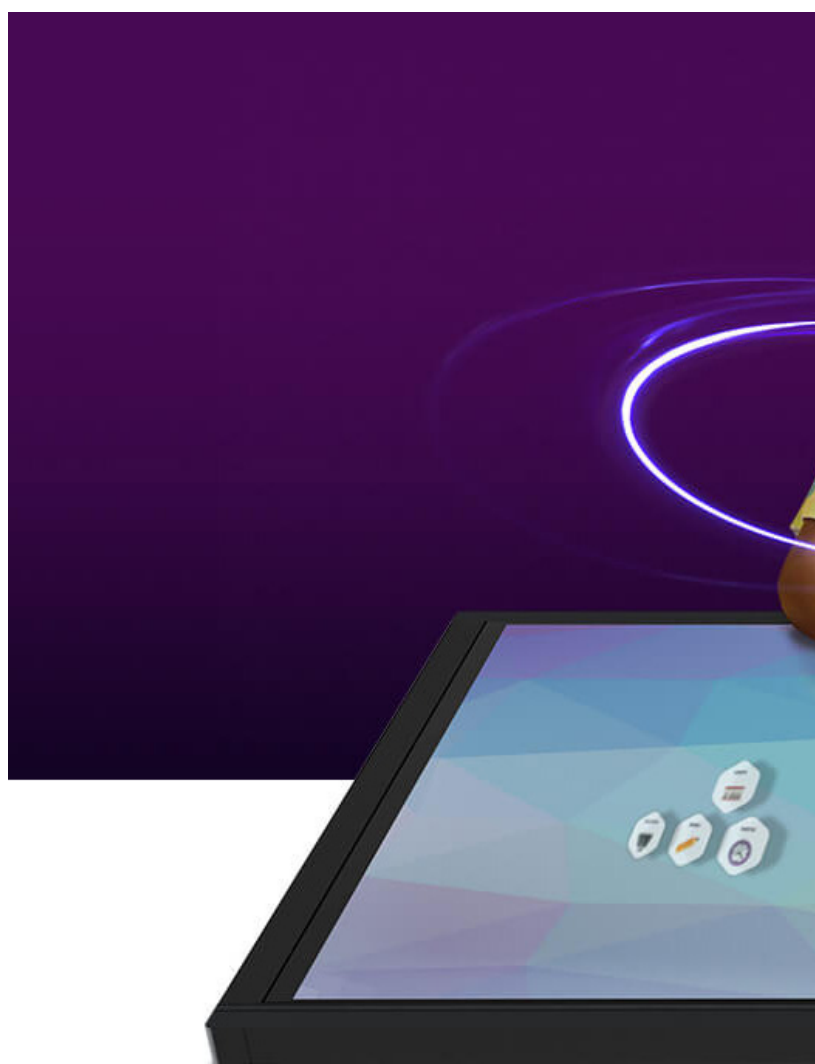
By, Kathy Scott, Learning.com

Your district has probably answered the question; will we use technology to support instruction? And, the next question is, how will we use technology to support instruction? After the investment in technology and shifting how your district budget allows for the purchase of hardware, infrastructure and peripheral devices the last thing you want to see is teachers not using these valuable resources to support instruction. Making sure that teachers and students have the appropriate digital materials to support instruction is critical however, technology is a tool, a very valuable tool.

This is just one perspective in a much larger picture of return on investment dollars with instructional solutions – be they delivered on-line or off-line. Here we will look at three areas of technology to ensure value on the investment: Learning to use the productivity tools of technology, supporting teachers with using technology as a tool for instruction, and what are the indicators for successful use of technology to support instruction.

## *Learning to use the productivity tools of technology.*

Technology and the productivity tools (word processors, spreadsheets, databases, presentation tools, cyber safety including online communication, etc.) are often assumed that students understand how to use these resources simply because they are “digital natives.”



eSchool News published an article last year by Laura Devaney, “Kids can tweet, but many lack digital literacy skills” shares data from research at the University of Connecticut. The Director of The New Literacies Lab at the University of Connecticut found that students “are woefully, dreadfully, inadequately prepared with reading online information and using it to learn new ideas.”

This problem has evolved and developed in to a \$1.3 trillion problem for the U.S. economy. CTE Vital Signs recently reported that there is a high

cost to low tech skills by the workforce – both in lost productivity which is an overall expense to the U.S. economy as well as earning potential differences of almost 40% (even with equal literacy and numeracy skills.)

Additionally, data from 2015 PARCC assessment shows that students performed better with pencil-paper version than they did online! While NAEP data shares that students, who practice writing online perform better on the NAEP writing assessment in 2011 than student who do not practice writing online.



Currently, coding is being added in states (32 states so far) as a graduation requirement and last year almost 43,000 students graduated with computer science degrees with over 500,000 open positions in the workforce nationally.

The need to teach digital skills (starting with basic keyboarding) is profound. Student must have this skill set to be successful today and tomorrow. Being able to adapt and change requires a foundation of transferable skills. This skill set will maximize your investments in technology. Supporting teachers with using technology as an instructional tool.

Districts are actively providing training and professional development sessions of all types for teachers. Types of trainings include face-to-face, district-based technology conferences, national conferences, one-on-one coaching, web-based training, instructional models and others. Teachers will make the technology purchases successful and ensure that instruction is impacted using digital devices.

ISTE (International Society for Technology in Education) provides a set of standards for teachers. These standards focus on the use of technology as an instructional tool to support teaching and learning as well as supporting the student standards.

Using the ISTE standards and measuring teacher success based on a set of national standards is a starting point and one that will support all teachers with which tool and how to use it. Personalizing their professional development is critical to their success and student instruction.

The recent iNACOL Conference reported an underlying theme of a greater focus on supporting teachers with the integration and use of technology as an instructional tool as reported by EdWeek Market Brief. Supporting teachers and allowing for them to grow individually with digital devices to support instruction is critical for all influencing perspectives (administrator, peer teacher, vendor, etc.) This support will continue to raise the return on investment in technology.



## ***Indicators for successful use of technology to support instruction.***

How do you know which tool to use when? Technology is a tool and teachers are required to balance the tools they use to best meet each student's needs. Personalizing instruction takes on many factors and digital publishers have a fire-hose full of tools to meet those needs. Products range from adaptive content that changes the difficulty level based on student interactions, flipped classroom instructional lessons that provide direct instruction allowing classroom teachers to provide application instruction of skills, and, of course, drill and practice which supports many instructional content areas like math.

Center for American Progress reported in 2013 that 24% of middle school students used spreadsheets on a regular basis while just 17% used statistical programs in math. Prior to that report, simply finding data on the return of investment on technology is not available – states and districts haven't known what to measure therefore they haven't measured anything around this investment.

Measure the return on your investment in technology, provide instruction around the ISTE Standards for Students and Teachers that integrates with

core instruction. Personalize to maximize both instruction and investment. ***Don't wait, start now.***



# *Game Changer!*

The Value Of Co-Sponsoring Relationships For Women In The Workforce

by Julie Kantor



Jayla, age 15, needs role models to show her viable career options and visions of what she can become. She would like to job shadow a successful woman who came to speak at her school to learn how she started her own technology firm.

Margaret, age 20, needs both role models and mentors to really talk things through, set some plans in motion, and help her understand her own leadership capabilities and where she needs to grow.

Margaret has engaged in her third internship as she understands it is one of the best ways to actively learn, network, and crucial to her workforce prospects. Interning, whether you are in school or a graduate, is a time that Millennials and GenZ heavily rely on mentors and colleagues to teach them the ropes, nuances, politics, and the hard skills.

As Shana, 36, rises through the ranks of corporate America, she might not have the nomenclature but she starts understanding that she needs something else... sponsorship. She needs internal champions to make it as a Partner or to the higher floors. She might see others who started with her going up the escalators at faster rates, and become disillusioned that her superior work doesn't just speak for itself.

She might quit or go to a new firm that she feels will value her more. Since starting my own company that focuses on mentorship and sponsorship to elevate women in the workforce (especially in STEM fields), I have learned some valuable lessons and garnered some new insights to share with you.

### *I have learned that:*

- Millennials want to be mentored, and they value it. In fact, Millennials view it as so crucial to their professional success, they will leave a company with a bigger name to find a company that will invest in their learning and development. I often tell my clients 'Mentor them or lose them.'
- Millennials also want their managers to be mentoring managers. They are looking for transformational managers, not transactional managers.
- Men are naturals when it comes to Sponsorship (to clarify, a mentor speaks to you and advises you, a sponsor is someone who speaks about you behind closed doors. A sponsor will often champion you for promotions, stretch assignments, and might offer air coverage when the going gets tough). When we discuss this topic, so many high-powered women shared with me that they were championed by a male leader.

- Today, women have networks and power. I'd argue that we are incredibly well poised for game-changing breakthroughs in the sponsorship arena, once we better understand it all. In fact, according to economist Sylvia Ann Hewlett, men are 46% more likely to have a high-powered sponsor. In her research, 83% of women do not have sponsors.

I read a piece in Harvard Business Review questioning if we are mentoring women but sponsoring men more in the workforce. While discussing this phenomenon, one tech leader said to me, 'Silicon Valley is built on sponsorship.' ... Fascinating perspective, and if you think about it, the entire "old boys network" is actually built on sponsorship. But ladies, it's our defining moment to join the party and make things happen for ourselves and others.

As an entrepreneur who is especially passionate about female entrepreneurship, I want to see you succeed at new heights and consider taking the elevator if the escalator has been a total drag. I want to encourage here a "stretch assignment" for you and your close networks to try on for size: Co-sponsorship.

I have found that men have been willing to sponsor us (women entrepreneurs) at higher rates, but that Co-Sponsoring with other high potential women is a great way to go. In my experience, it has been so mutually valued and has yielded all kinds of incredible opportunities including client relationships, new jobs and more.

To get started, you do need to be fairly confident with your own network. You need to have clear goals personally or professionally that you feel others can help you with. So skip the escalator, hit the Penthouse floor button and embark on a three month 'Co-Sponsoring' Experiment Plan...



WEEK ONE (The Ground Floor): I want you to find 2-3 other women (you can pick a man to!) who are networked and who you really respect. People you already know pretty well. Pick people you feel will make a good impression on others as they have made on you. Perhaps they are doing work or started a company that you really feel has high potential. Perhaps they are a past colleague or you currently serve on a board together. Schedule calls with them or plan a lunch meeting.

THE FIRST MEETING: Listen for what your colleague needs, where they are at in this stage of their professional lives, and assess if you can truly help them somehow. Could you be a champion for Tanya who wants to speak at the major women's conference you spoke at last year, or Cynthia who just left her COO job at a major bank and needs access to recruiters and CHRO's of major companies? Could you advocate for Lynette who is starting a cause to teach tech skills to middle schoolers in your city?

While they are talking, jot down 2-4 action items you could take on their behalf and envision introductions you could make or opportunities you could create. You have so much more to offer than you realize, just listen and you will begin to connect the dots.

Next, I want you to SHARE what you are building professionally, what you are most passionate about. Discuss what your needs are, types of companies or people you aspire to work with or be connected with. If necessary, you can add that you are part of this Co-Sponsor experiment and are looking to build a few relationships where "we help each other formally to make things happen!"

Leave the meeting with a game plan on what you each are comfortable doing. There is nothing wrong with starting with small steps. Keep things low-pressure and have fun with it. Schedule an appointment to follow up and discuss the next leg of the Co-Sponsorship journey within the next 3-4 weeks. So many meetings lose their potential due to lack of follow-up or follow-through.

THE SECOND MEETING (You are Riding Up): Are there any early fruits from your labors? Did you make introductions? If not, do it together while you are on the phone. Remember, you are also accountability partners as you climb together. If you followed up on your meeting one commitments which I hope you did, how did it go? Track carefully what you each agreed to do and where things stand. Feel free to start a shared Google Doc.

Often, I will ask my Co-Sponsor(s) to send me some solid wording for how they want to be introduced, and then write to people within my network asking if they are open to an introduction. People really do value being connected to other great people. It's been actually quite heartwarming and fun to be the connector. The middle woman.

At this stage, you might want to map out a few more action plans and understand any new needs your Co-Sponsor might have. One amazing woman leader I met on LinkedIn is speaking at a major conference in Silicon Valley this Spring. After we spoke she contacted the conference organizers and created an opening for me to speak as well... Many entrepreneurs also offer each other financial incentives if business comes in from each others connection. I do, and that creates another level of WIN/WIN in these crucial championing relationships.

**THE THIRD & FOURTH MEETINGS :**  
Are you both rising and stronger because you came together? Why not meet somewhere where you can introduce your Co-Sponsor to people or invite her to join a key conference call. Get her a seat at a table that she will benefit from. Bring her to an open board meeting. Introduce her to other key leaders you socialize with.

Goodwill begets goodwill. If the relationship is feeling lopsided, think about how you might remedy this and continue tracking and following up.

So many people don't read emails, follow-up in a timely manner or check their LinkedIn— Not a problem, just circle back politely. With one of my Co-Sponsors, I received a wonderful client contract immediately from a connection he made but it took three more months until one of my connections became lucrative for him. I sent him 10% of the contract I received to say thanks, something he never asked for, but is part of our business model @ Twomentor.

Send a plant, a Starbucks card, plan a spa day, show gratitude and continue to keep the ball rolling toward mutual gain. Keep advancing each other, and keep building Co-Sponsorship relationships that focus on abundance, not scarcity. Enjoy your new views and vistas.

Good luck!

*Julie Kantor is CEO of Twomentor LLC. She works with major corporations and organizations to build mentoring cultures that retain a diverse skilled workforce. She can be reached through [info@twomentor.com](mailto:info@twomentor.com)*

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# GEORGIA PATHWAYS

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